United States Department of Agriculture
Cooperative State Research, Education, and Extension Service
Office of the Administrator

Self-Review for 2003/2004
Portfolio Review Expert Panel

Portfolio 1.4: Structure of the Agricultural Sector and Farm Management

Supporting Objective 1.4

CSREES Goal 1: Enhance Agricultural Opportunities for Agricultural Producers

For the period 1998-2004

2003/2004 INTERNAL REVIEW PORTFOLIO: STRATEGIC OBJECTIVE 1.4

Structure of the Agricultural Sector and Farm Management

(Response to External Review Panel Recommendations from June 2004

And

Progress Report)

December, 2005

Internal Report for Portfolio 1.4

Introduction

In response to directives from the Office of Management and Budget (OMB) of the President for the review of all federal programs under the PART (Program Assessment Rating Tool), in 2003 CSREES began systematically reviewing its progress in achieving its mission, as outlined in the CSREES Strategic Plan. The CSREES Strategic Plan has the same five goals as the USDA Strategic Plan, and supports practically all USDA strategic objectives via knowledge generation and dissemination. All research, education, and extension activities being conducted under the auspices of CSREES are organized into portfolios of work that support USDA/CSREES strategic objectives. A portfolio of work is the cluster of CSREES research, education, and extension programmatic efforts that are funded, implemented, and integrated over time to solve national problems, meet national needs, and realize economic and other opportunities for citizens. The strategic goals, objectives, and supporting portfolios are listed below.

The portfolio review process begins with a self-review written by CSREES National Program Leaders (NPLs). Once each portfolio self-review document and its supporting evidentiary documentation of portfolio outcomes is assembled, external panelists meet to discuss and judge the portfolio accomplishments. The portfolio accomplishments are judged on the key OMB research and development criteria of relevance, quality, and

performance and their dimensions. The dimensions of the R&D criteria used for rating are as follows:

Relevance

- Scope
- Focus on critical needs
- Identification of emerging issues
- Integration of CSREES programs
- Interdisciplinary integration

Quality

- Significance of findings and outputs
- Stakeholder assessment
- Alignment of the portfolio with current science
- Methodological rigor

Performance

- Portfolio productivity
- Portfolio completeness
- Portfolio timeliness
- Agency guidance relevant to portfolio
- Portfolio accountability

Panelists use a standardized, transparent, and replicable process to determine each portfolio's contribution to the agency's stated mission. Panelists are senior, preeminent subject-matter and evaluation experts in relevant fields from university, corporate, and government environments. The panelists also provide comments and recommendations to CSREES for portfolio improvements.

Each individual Portfolio is submitted to an external panel every five years. In the intervening internal reviews are conducted by National Program Leaders as CSREES. The internal reviews investigate how well the Agency has addressed the panelists'

suggestions and concerns. They track the progress being made by the Portfolio over the time period between Outside Expert Panel assessments and are one of the components utilized by CSREES to monitor programmatic outcomes. These internal assessments are shared with members of the Expert Panel responsible for the suggestions and the comments and feedback are encouraged.

In 2004 Portfolio 1.4., *Structure of the Agricultural Sector and Farm Management,* was presented to an outside expert panel. It was scored by the panel as 'moderately effective in supporting the CSREES objective.' This internal report details the progress that has been made and challenges which have occurred in improving the performance of the Portfolio and addressing the issues raised by the Expert Panel.

The remainder of this report is broken into four sections. The first details the programmatic coverage which falls under Portfolio 1.4. and presents the findings of the Expert Review Panel. Portfolio 1.4 is one of fifteen Portfolios in the CSREES catalog and, to date, eleven of these portfolios have been presented to and scored by outside Expert Review Panels. Several general themes have emerged from these panel reports and Section Two of this paper describes these themes and documents how CSREES has begun responding to these issues. Section three of this paper addresses issues raised that are specific Portfolio 1.4. It includes a discussion of how knowledge areas are being addressed, evidence gathered since the External Review and a discussion of steps being taken to set up long term measures that will allow for the more effective documentation

of the results being achieved by programs encompassed in this Portfolio. It also includes the score given to the panel by the internal team in 2005.

Part I: Portfolio Description

The U.S. agricultural sector must be able to quickly respond to changing political, economic, technological, environmental, and consumer-driven market forces. Agricultural production and markets are constantly affected by external factors such as weather and growing conditions, diseases and pests, financial conditions, cultural practices, and consumer demand. New and emerging risks associated with domestic and international policy, genetic technology, exotic invasive species, and complex agricultural diseases that can affect humans defy conventional means of identification, quantification, and management. CSREES contributes to the improvement and strengthening of this responsive agricultural system through sponsoring research into alternative methods to identify, assess, and manage risk, providing relevant education, and extending information and practices to improve production and market decision-making through enhanced risk management. Portfolio 1.4 includes Knowledge Areas:

- KA 601 Farm Management and Risk Management
- KA 401, Structures, Facilities, and General Purpose Farm Supplies
- KA 402, Engineering Systems and Equipment
- KA 404, Instrumentation and Control Systems

A description of the work being done in each of these KAs follows directly below.

KA 401: Structures, Facilities, and General Purpose Farm Supplies

Overview

This KA is focused on extension and research for the design, construction, and cost of facilities for animals, agricultural products, agricultural inputs, equipment, and other materials. The properties and behavior of the animals, products, equipment, and materials while in various facilities and during transport or processing is a part of this KA.

Areas of extension and research include but are not limited to:

- Engineering aspects of design and construction of structures and facilities.
- Physical, chemical, and biological aspects of the production of fertilizers, pesticides, feeds, and hormones.
- Engineering aspects of materials handling, transport, land use, and storage of crop, forest, and range products.
- Studies on biological, chemical, and physical properties of materials.
- Behavior of chemical and biological materials in storage systems.
- Determining costs and benefits of construction or engineered systems.
- Determining maintenance needs and costs of agricultural systems.
- Facilities for handling, processing, and storing new food and fiber products, animal feeds, forage, and bedding.
- Structures and facilities for housing and handling animals.
- Facilities for handling and storing fuel, fertilizers, pesticides, and other farm supplies.
- Environmental control of structures for animals, plants, or agricultural products.

This KA does not include research on:

- Safe handling and use of materials and equipment. (This information can be found in KA 723)
- Facilities that reduce environmental stress in animals. (This information can be found in KA 306)

Situation

The on-the-farm facilities/buildings have always been a major component of agricultural production of plant materials and animals. This will continue into the future whether production agriculture continues to consolidate resulting in fewer small farms and more large farms. The large farms, whether they are large greenhouse operations or large livestock and poultry operations will require specialized structures that provide consistent high quality products that are efficiently produced.

The overall effort for extension and research towards these structural related activities has declined over the past decades. At one time there was a major focus within agricultural

engineering departments on farm structures, but that has declined significantly. There are few remaining extension, teaching and research faculty at LG universities working solely on agricultural structure issues. The design and construction of new facilities such as: confinement livestock and poultry structures, greenhouses, milking parlors, grain storage, and machinery storage are carried out by commercial engineering design companies with little input from the Land Grant system.

The current extension, education and research effort related to structures of livestock, poultry and aquaculture is focused on environmental issues as a result of the facilities and the management of the wastes/manure. This may include water quality for aquaculture and odors, particulates and gases from livestock confinement structures. There are other KAs (133, Pollution Prevention and Mitigation; 403, Waste Disposal, Recycling and Reuse; 141, Air Quality) that address environmental issues which are not covered in this portfolio review. There are also KAs like 503, Quality Maintenance in Storing and Marketing Food Products 512, Quality Maintenance in Storing and Marketing Non-Food Products; 205, Plant Management Systems; 306, Environmental Stress in Animals; and 315, Animal Welfare, Well Being, and Protection which may have some overlap with KA 401.

There were over 70 projects identified through a CRIS search of KA 401. They can be categorized by subject under: wood structures, air quality of animal confinement structures, greenhouses, aquaculture, storage or livestock buildings, and other. There were 27 projects focused on the design and components of wood structures. There were

12 projects strongly related to odor and gases emanating from livestock and poultry structures. Greenhouse related projects accounted for 6 projects, while storage of agricultural products accounted for 6 projects. There were 10 projects that were difficult to place in a category. There were no projects from minority institutions. There were eight projects from industry funded thru special grants or SBIR. The aquaculture projects (6) consisted of three funded by SBIR and the rest funding for the NE Regional Aquaculture Center. There was only one non-land grant university project.

The situation with this KA is that there is a small amount of resources, relative to other KAs, devoted to these topics, ranging from environment in livestock structures to design of wood members for strength and durability. The issue is whether there is justification for advocating additional resources and whether there are new topics for this KA that should be addressed.

KA 402: Engineering Systems and Equipment

Overview

Knowledge Area 402, *Engineering Systems and Equipment*, concentrates on increasing production efficiency while decreasing dependence on labor through mechanization of agricultural and forestry production tasks. The scope of this knowledge area, though broad, does have important limitations. KA 402 includes:

1. Tillage, planting, nutrient and chemical application, and harvesting systems including geographical information systems, sensors, and robotics but not including irrigation and drainage systems; and,

2. Handling means for animals, plants, animal products and plant products, but not food and non-food product processing, storage, and marketing;

The manual of classification in use between 1998 and 2002 does not clearly differentiate between this knowledge area and knowledge areas 205, 207, 307, 404, 501, and 511. It should not include: Food and non-food processing; crop, herd, and forestry management; or irrigating systems. As a result, about 35% of the projects that cite 402 focus primarily on systems and equipment as defined above while 9% focus on structures and facilities (KA 401), 19% on instrumentation and control systems (KA 404) and 42% on other areas (including KA's 205, 207, 307, 501, and 511).

Situation

According to data collected by the National Agricultural Statistics Service (NASS), in 2002 United States farms spent at least $48.3 billion (25.4% of all farm expenditures) on labor related expenses. This sum does not include the equivalent of the principal operator or his families' hourly wage, i.e. profit. In sharp comparison, NASS estimates that U.S. farms spent $26.2 billion (13.6%) on farm machinery and equipment including maintenance and fuel. This figure also includes farm building renovations and repairs, so the actual amount spent on machinery and equipment is somewhat lower. Given that the average farm spends at least twice as much on labor as it does on machinery and equipment, agriculture's research and outreach community has a responsibility to develop novel and improved systems to reduce labor costs and increase farm production efficiencies.

The above data also does not account for lost time due to farm work related injuries, illnesses, and fatalities. Even conservative estimates of the cost of farm-related fatalities, injuries, and disease suggests that the agricultural safety and health knowledge is a $4.5

billion annual issue (National Safety Council, 2001) with substantial potential for large returns on investments made to reduce or eliminate the losses.

New engineering systems, especially equipment and machinery designed to reduce labor demands while preserving product and environmental quality, hold great potential to reduce labor costs while increasing machinery related costs less than a commensurate amount which would hopefully result in increased profits (or at least reduced debts) for producers.

KA 404: Instrumentation and Control Systems

Overview

The Knowledge area, Instrumentation and Control Systems (404), aims to create the scientific and technological knowledge base that will enable producers, processors, and land managers to collect, analyze, and apply precise and timely information. Agency-wide programmatic direction supports three, sequentially dependent activity areas: (1) data collection, (2) analysis and interpretation, and (3) decision support for application to management or policy making. This includes sensing devices, information and decision-support systems, simulation models, controllers and actuators, communications, and new agricultural practices and infrastructures that are compatible with increasingly data-rich environments. Because these systems create entirely new agricultural and natural resource capabilities, training new professionals and outreach to end-users are essential companion objectives.

The published definition of Knowledge Area 404 was the following:

- Instrumentation and information systems are important elements in all aspects of pre- and post-production agriculture. Sensors for detecting and monitoring and processing of the collected data can provide improved control of the production and processing of biological and non-biological materials.

Areas of research include but are not limited to:

- Development of instruments, research technologies, and procedures that enhance agricultural efforts.
- Determining accurate and precise standards of measurement.
- Development of sensors, image processing techniques, automation, decision support systems, controls, and models.

This Knowledge area excludes research on:

- Experimental design and statistics (This information can be found in KA 901).

Nearly all other programmatic areas within the agency benefit from the research and application capabilities afforded by developments in this Knowledge area. These include, but are not limited to, agricultural & food safety/security, air, soil & water quality, inspection & monitoring, nutrient management, carbon management, agricultural & forest production, water management, pest management, invasive species, forest management, ecosystem studies, wildlife management, and animal & plant health. Because of the broad applicability of instrumentation and control systems, inputs, outputs, and outcomes are diffused throughout the agency efforts on many national issues.

The following logical organization of Knowledge Area 404 depicts three broad emphases along with several subordinate topics.

Biophysical sciences and chemistry

- Basic research
- Materials & processes

- Proof of concept

Engineering and technology development, testing, and validation

- New devices and/or systems
- Laboratory, and in situ, testing
- Application development

Adoption, economics, and decision support

- Aides & barriers for adoption
- Applications & economics
- Information management & decision support

Situation

Need

Direct, human observations can provide only general and unreliable qualitative information about crop development and health, food safety, and environmental quality. Furthermore, such observations are extremely limited in time and location. We often need more exact quantitative measurements with greater frequency and at many locations. Measurement needs cover a broad range of spatial scales (from landscape-level assessments to bacteria counts on individual food products) and vastly different time frames (from decadal climate change to continuous air monitoring near livestock operations). Sensor systems can make these needed measurements at high spatial and temporal frequencies. Engineered sensors and companion instrumentation and software extend human observational capabilities to help ensure that our crops are healthy and productive, our food is safe and nutritious, and our indoor and outdoor environments remain uncontaminated. Advances in biometrology and information technologies are required to address our need for timely and reliable information that has temporal and spatial relevance.

Issues

Food safety and quality represent one of the greatest public issues/concerns nation-wide. Safety and quality are very dependent on inspection and monitoring methods that can detect contaminants and discriminate defective (or poor quality) product. Whereas manual, microscopic, or bio-assay inspections cannot be performed quickly and accurately on 100% of any food product, sensor and instrumentation technologies currently under development and testing promise to offer inspection capabilities that are accurate, fast (real time), and consistent. These technologies can range from detecting: internal bruising of apples to 10 cells of *Listeria* (a particularly virulent food pathogen) to insect infestations in a ship's cargo of grain.

Like crop production, animal production economics exhibits small profit margins. This makes the growth, development, reproduction, and well-being of each animal critically important for a profitable enterprise. Current technologies allow producers to monitor individual animal feed consumption, feedlot movement, temperature, lameness, milk production, meat composition and quality, and weight gain—often without any human intervention or presence. While animal tagging has been commonplace for decades, it is now possible to attach electronic tags that can measure and record animal condition, e.g., temperature or heart rate. Elevated temperature can signal estrus onset or a possible disease condition. Electronic tags can also be used for identification and marketing purposes. Many feeding, measuring, and monitoring systems have also been developed or proposed for aquacultural applications. Total investments in animal care and feeding

during the course of each animal's production life are significant. New tools and technologies can help producers capture a return on that investment.

Environmental quality is another area where sensor-based monitoring can be very helpful. For example, air quality monitoring around confined animal feeding operations can be used to keep ammonia or odor emission within acceptable limits. Water monitoring for nitrogen and phosphorus runoff from agricultural lands can help regulate freshwater algae blooms and costal-zone hypoxia. An ability to quickly and accurately measure carbon sequestration in soils can facilitate more widespread application of a carbon-credit and trading marketplace. These types of measurement activities create special knowledge, however, because the elements being measured are molecular scale and smaller and they need to be quantified over large land areas. Nevertheless, these applications are scientifically possible; it remains to develop the engineering and technology capability to make them economical and practical.

Collecting data from one instrument, or many instruments, is only the first step in the overall decision-making process, which might be inspection, monitoring, tracking, etc. Often, many other components, e.g., data bases, simulation models, mathematical optimization, must be combined to form a fully developed decision support system (DSS). The final output of a DSS is a recommendation, interpretation, or prediction regarding the situation of interest, such as crop treatment, food safety, or water quality. DSSs may also incorporate economic models or calculations to determine which courses of action are reasonable. Other exogenous factors that might need to be considered

include operational cultures within the organization or the industry or current financial markets.

KA 601: Economics of Agricultural Production and Farm Management

Overview

The focus of Knowledge Area 601 is on the economic choices farmers and ranchers make to access and allocate resources for the production of commodities, services, and products. These resources are what help farmers and ranchers to minimize production and other forms of risk thereby assisting them to optimize farm income. CSREES's role involves program operational responsibilities, administrative oversight of projects funded by various sources of funds, and the interaction with various stakeholder groups involved and interested in this knowledge area. Economics of Agricultural Production and Farm Management cuts across two major programs within CSREES, namely the Risk Management Education (RME) Program and the Farm Management Program.

The RME Program is funded directly by the Congress ($5 million annually), with additional work being conducted on various projects funded through Hatch, Smith-Lever, Special Research Grants and Federally Administered Grants projects. Approximately .35FTE of a National Program Leader is dedicated to the RME Program.

There is no directly funded Farm Management Program, per se. However, this program does have a dedicated National Program Leader (NPL) with approximately .20 FTF of his time allocated to this and related issues. The program is funded primarily at the state and

regional level via Hatch funding, Smith-Lever funding, Special Research grants, and Federally Administered grants.

The Risk Management Education Program and the Farm Management Program are discussed separately in the following two sections.

Risk Management Education Program

Overview

The purpose of the CSREES RME Program is to develop educational and training programs that emphasize improving the ability of producers and their families to more effectively manage risk associated with farming and ranching, thereby improving farm profitability, net income, and family well-being.

Risk is obviously an important aspect of the farming business. Producers must choose among numerous alternatives that reduce the financial effects of the uncertainties of weather, yields, prices, costs, government policies, global markets, and other factors and influences that can cause wide fluctuations in farm profitability and net farm income. The CSREES RME Program identifies five general types of risk for which partners in the land-grant university system and non-profit and for-profit organizations develop and deliver risk management education products to producer. The areas for which these products are developed and delivered are production risk, price or market risk, financial risk, institutional or legal risks, and human or personal risks.

Funding is authorized by The Agriculture Risk Protection Act of 2000 (Public Law106-224, June 20, 2000) which amended "the Federal Crop Insurance Act to strengthen the safety net for agricultural producers by providing greater access to more affordable risk management tools and improved protection from production and income loss, to improve the efficiency and integrity of the Federal crop insurance program." Congress added a new subparagraph to Section 524, Education and Risk Management Assistance, Section 524 (1) (B): The Secretary, acting through the Cooperative State Research, Education, and Extension Service, shall carry out the program established under paragraph (3), Partnerships for Risk Management Education (partnerships are with the land grant university system, CSREES, for-profit and non-profit organizations in the private sector.

Subparagraph (A) directs the Secretary, acting through the Cooperative Research, Education, and Extension Service, shall establish a program under which competitive grants are made to qualified public and private entities (including land grant colleges, cooperative extension services, and colleges or universities), as determined by the Secretary, for the purpose of educating agricultural producers about the full range of risk management activities, including futures, options, agricultural trade options, crop insurance, cash forward contracting, debt reduction, production diversification, farm resources risk reduction, and other risk management strategies.

The legislation directs the Commodity Credit Corporation to make available for the CSREES RME Program and the Risk Management Agency's (RMA) Targeted States

Program a total of $10 million for fiscal year 2001 and each subsequent fiscal year. Of the $10 million, $5 million is specifically allocated to CSREES.

It should be noted that the CSREES program is one of several USDA's management education programs. The others are managed by the Risk Management Agency (RMA) with an annual budget of $25 million.

Prior to 2004, there was minimal coordination between CSREES and the RMA regarding their respective risk management education programs. However, in the spring of 2004, CSREES initiated a meeting of the RME program managers in RMA and CSREES. That meeting was the first of its kind and set the stage for developing a closer, more coordinated relationship between the two agencies' programs. The initial step in this effort was to ensure each agency was aware of what projects were funded by the other to minimize the potential for inadvertent duplicate funding of projects. Future plans call for the coordinated release of Requests for Applications to enhance the potential of joint funding projects that address each agency's goals, and to use a consistent format for progress and final reports.

In accordance with the Agricultural Risk Protection Act of 2000, CSREES began a Risk Management Education Competitive Grants Program in 2001. CSREES established four regional risk management education centers that were required to compete annually to receive funds. These centers (Northeast-University of Delaware; North Central-University of Nebraska-Lincoln; Southern-Texas A&M University, and Western-

Washington State University) used the granted funds to establish their own competitive grants programs to fund regional risk management projects. A "Digital Center for Risk Management Education" was established at the University of Minnesota via a standard CSREES RME grant. The Digital Center provides electronic support to the four regional centers with regard to electronically accepting pre-proposals, proposals, progress reports and final reports, and an archival service for all projects funded under the RME Program as well as linkages to other sites with relevant risk management information.

In FY 2004, a series of changes to the structure of the program were initiated. First, funds that were allocated to a national competition were instead distributed to the regional centers with the proviso that they will conduct a competitive grant program for multi-regional projects. Second, a set of common operating guidelines were developed which provides specific protocol for a wide range of procedures. Third, "Streamlining Agreements" were established with each center to give them responsibility for processing awards. Fourth, the competition for center grants will be done every fourth year instead of every year.

Situation

The overall goal of the Risk Management and Farm Management programs are to enhance the profitability of farmers and ranchers. Specifically relating to risk management, the goal is to identify those aspects of risk management that farmers and ranchers need help with, and to develop educational and training tools to assist them in achieving adequate or acceptable risk management knowledge for them to make informed decisions. In addition, this goal is first accomplished by providing leadership in

identifying and meeting research (applied), education and extension needs of producers in the risk management area. This is carried out by the four risk management education centers each of which has an advisory council composed of representatives from stakeholder groups (farmers, agricultural insurance, RMA, commodity groups, NGOs, banking and lending institutions, state departments of agriculture, etc.) These councils meet twice a year. The first meeting is to provide to the respective center director their learned judgment as to the current regional needs and priorities that form the basis of each center's Request for Applications. The center directors use this information as the basis of change each year for their respective RFAs. The councils meet the second time to review proposals and recommend to the center directors projects to fund and the level of funding for each.

The second way CSREES assists in achieving the overall goal is the fair and equitable distribution and efficient management of funds made available to CSREES for these purposes. These include Smith-Lever (extension) funds, Hatch (experiment station) funds, RME Program funds and Congressionally earmarked funds that include Special Research funds and Federally Administered Project funds.

Commencing in FY 2004, CSREES will distribute the entire $4,800,000 ($200,000 is allocated to CSREES for administration of the program) to four regional centers and an electronic support center on a competitive basis. The four regional centers will use these funds to run their own competitive programs regionally, but will also entertain multi-regional projects. Additionally, these centers will support other risk management

education activities for various audiences that their advisory councils believe need additional assistance. However, the focus on all their activities is on producers and outcomes, as opposed to activities and outputs.

The electronic support center will provide a number of services to the four regional RME centers, including electronic publication of regional RFA's, electronic receipt of pre-proposals, proposals, annual progress reports, and final reports. Additionally, the electronics support center will provide archiving of all funded projects and their results with public access, links to other risk management education activities, and other pertinent risk management information.

The RME Program is designed first and foremost to emphasize the development and delivery of information on risk management information and tools for producers, with an equal emphasis on specific outcomes for the targeted audiences. The proposal receipt structure and progress reports structure are designed with these two areas of emphasis in mind. The guidelines for proposal preparation as published by each of the centers have a consistent format that emphasizes outcomes in terms of behavioral change of targeted audiences. The current supporting Digital Center at the University of Minnesota actually builds (electronically) the template for progress and annual reports for each proposal as they are accepted for review. Hence, those who eventually receive a grant from these centers have the outline for their progress reports and final reports so that the reports are consistent in format for all four regions.

In addition to RME Program activities, there were many funded by CSREES and other Federal agencies as reported on CRIS. Of the total 2049 projects that included Knowledge Area 601, 1779 were funded by CSRESS through a multitude of funding sources (Hatch, McIntire-Stennis, Evans-Allen, Animal Health, Special Grants, NRI grants, SBIR grants, other CSREES funds). Of these, 391 contained "risk management" either in their title or in key words. Thirteen- of the projects were conducted by the Economic Research Service, and were primarily focused on the economics of agricultural production and farm management. ARS funded 79 projects with Risk Management and 13 of those incorporated economics, at least peripherally. CSREES funded approximately 286 of the 391 projects with risk management, and 97 of these incorporated economics as a major emphasis. For example some dealt specifically with livestock marketing, other with alternative agricultural practices or business (for example, bio fuels), while others examined optimum timeliness of marketing various commodities to maximize revenues. Still others examine various forward contractual options, environmental risks, labor-related risks, and marketing or price risk.

Farm Management Program

Overview

Farm management, simply stated, is all about managing land, labor and capital so as to obtain the highest possible returns consistent with the farm and/or farm family goals and values. This rather simple statement belies the complexity involved in achieving the desired ends.

With the exception of the Initiative for Future Agriculture and Food Systems (IFAFS) in which one program area was dedicated to farm management in a broad way (Farm Efficiency and Profitability), there are no dedicated funding programs within the National Research Initiative or in the Section 406 integrated programs that deal with farm management from an economic perspective. Obviously, there are many funded projects that involve one or more aspects of farm management in the SARE Program. Other sources that fund farm management projects are Hatch funding, Evans-Allen funding, Smith-Lever funding, Special Grants and Federally Administered grants. These are funded at the State and multi-State level, but not in any coordinated, national effort.

The responsibilities of the NPL for Farm Management center on reviewing the above noted projects to ensure they meet the goals and objectives of the funding criteria and parameters specific to the funding source, participating in multi-State project meetings, reviewing proposals for Special grants and Federally Administered Grants (Congressional earmarks) to ensure they meet the parameters established in the authorizing and appropriations language, and participating with the regional extension committees organized around farm policy, farm marketing, and farm management. Another responsibility is to keep interested parties informed of possible funding opportunities within in CSREES and other agencies in the USDA, foundations, and other governmental agencies. However, having only 20% of the time of one NPL assigned to the farm management area makes for very thin coverage, considering the large amount of agricultural research, education, and extension resources that are dedicated to farm management.

Situation

The structure of agriculture has changed significantly over the last decade, and continues to develop in a dichotomous fashion, increasingly large farms producing a greater share of total production, and increasing numbers of small farms, with middle-size operations declining. Another change that is occurring is the increased "industrialization" or concentration in the livestock sector, and in particular finishing yards and packing plants. As a result, there are now fewer buyers for grain, decreasing the marketing "power" of individual farmers. And within the retail sector, internationally as well as nationally, more and more of the retail space is being controlled by fewer and fewer companies, increasing their marketing power in terms of their purchasing power, and therefore, marketing power. Consumers, here and abroad have concerns with GMOs and food attributes that are creating challenges on the demand side of the equation. On top of all of this, is the increase in international trade which has benefited some sectors but has had devastating short-run impacts in other agricultural sectors and commodities. A further compounding situation is the increasing emphasis being place on homeland security and the apparent vulnerability of the food production and distribution systems in this country. In addition, financial institutions are becoming more concentrated as well that in some areas have resulted in less credit being made available, and often at higher costs. The liabilities arising out of environmental issues, such as pesticide applications, runoff, manure management, in-field nutrient management, air quality standards, etc. also poses many challenges to today's producers.

This setting results in an economic and political climate that requires farmers interested in long term survival to practice the best farm business management practices they can. Cutting-edge managerial practices need to be adopted. It is from the farm production plans, farm finance plans, farm marketing plans, and farm strategic planning that comprise the bulk of the farm business plan and identifies the managerial needs and requirements. The challenge, from CSREES' perspective, is to try to ensure that adequate resources are being pumped into the development of alternative farm planning products, managerial tools, and long-term strategic planning tools, and to ensure an adequate delivery system exists through which these products may be passed on to the farmers who need them. However, that is a topic for PA 602- Business Management, Finance and Taxation.

While the Risk Management Education programs of CSREES and RMA address many of the concerns surrounding farm management, there is not a distinct, funded farm production and farm management program in USDA per se. The various States through their own funding, formula funding, and other sources carry out many excellent farm management programs, but they are done often without the assistance of a national program. Are we currently allocating resources to the real needs of producers? While the regional extension and research committees meet and information is exchanged, the system does not have a formal national arena where issues that are national in scope may be discussed and addressed. Is there a need for a more coordinated approach in terms of identifying high-priority needs within the farm management arena and then reallocating resources accordingly?

Have we adequately addressed the ramifications of revised or new trading agreements, marketing products/commodities that are genetically modified, and the interrelationships of farms and their local communities. Current and future farm managers will need managerial skills in a number of areas, but most importantly will be skills in communication, business and economics, and understanding the implications of technology, in terms of production and marketing.

Summary of Part I

Taken together these diverse Knowledge Areas comprise the programmatic content of Portfolio one. The Portfolio was presented to a review panel in concert with Portfolio's 1.1 and 1.2. The panels report is included in Appendix I. It should be noted that while other Portfolios are included in this summary, only Portfolio 1.4 and the issues raised by the panel concerning it, are addressed in this report. Two other reports concerned with the Portfolios 1.1. and 1.2 are being published simultaneously with this one and are available from CSREES.

Part II: General Themes Occurring Across Many Portfolios

Since the Expert Panel Review process began in 2003 eleven expert panels have been convened and each has published a report offering recommendations and guidance. These external reviews occur on a rolling five year basis. However, despite the fact that the external reports were all written independent of one another on Portfolios comprised of very different subject matter, several themes common to the set of review reports have emerged. This set of issues has repeatedly been identified by Portfolio Review Panels and requires an agency wide response. The agency has taken a series of steps to effectively respond to those overarching issues and these responses are discussed below. While it is not the case that every issue was one identified by the Expert Panel responsible for reviewing Portfolio 1.4 many were and the overarching responses of the agency will help .

- **Issue I : Getting Credit When Credit is Due**

  For the most part panelists were complimentary when examples showing partnerships and leveraging of funds were used. However, panelists saw a strong need for CSREES to better assert itself and its name into the reporting process. Panelists felt that, often times, principal investigators who conduct the research, education and extension activities funded by CSREES don not highlight, the contributions made by CSREES. Multiple panel reports suggested CSREES better monitor reports of its funding and ensure that the agency is properly credited. Many panelists were unaware of the breadth of CSREES activities and believe their lack of knowledge is partly a result of CSREES not receiving credit in publications and other material made possible by CSREES funding.

Issue I: Agency Response:

In 2005, in an effort to address the issue of lack of credit being given to CSREES for funded projects, the Agency implemented several efforts likely to improve this situation.

First it developed a standard paragraph about CSREES's work and funding that project managers can easily insert into documents, papers and other material funded in part or entirely by CSREES.

Second, the Agency is in the process of implementing the "One Solution" concept. The One Solution will allow for the better integration, reporting and publication of CSREES material on the web. In addition, the new Plan of Work, centered on the Logic Model framework, will become operational in June 2006. The Logic Model framework is discussed in more detail below. Because of the new Plan of Work requirements and the Plan of Work Training conducted by the Office of Planning and Accountability (also described in more detail below), it will be simpler for state and local partners to line up the work they are doing with agency expenditures. This in turn will make it easier for project managers to cite CSREES contributions when appropriate.

- **Issue II: Partnership with Universities**

  Panelists felt that the concept of partnership was not being adequately presented. Panelists saw a need for more detail to be made available. Questions revolving around long term planning between the entities were common as were ones that asked how the CSREES mission and goals were being supported through its partnership with University partners and vice versa.

Issue II: Agency Response:

CSREES has taken several steps to strengthen its relationship with University partners. First, to the extent possible, implementing partners will be attending the CSREES strategic development exercise which is intended to help partners and CSREES fully align what is done at the local level. Second, CSREES has realigned the state assignments for its NPLs. Each state is now assigned to one specific NPL. By reducing the number of states on which any individual NPL is asked to concentrate and assigning and training NPLs for this duty, better communication between state and NPL leaders should occur. Finally, several trainings that focused on the POW were conducted by CSREES in geographic regions throughout the country. A major goal of this training was to better communicate CSREES goals to state leaders which will facilitate better planning between the universities and CSREES.

- **Issue III: NPLs**

  Without exception the portfolio review panels were complimentary of the work being done by NPLs. They believe NPLs have significant responsibility, are experts in the field and do a difficult job admirably. Understanding the specific job functions of NPLs was something that helped panelists in the review process. Panelists did however mention that often times there are gaps in the assignments given to NPLs. Those gaps leave holes in programmatic coverage.

Issue III: Agency Response:

CSREES values the substantive expertise National Program Leaders bring to the Agency and therefore requires all NPLs to be experts in their respective fields. Given the budget constraints often times faced by the agency, the agency has not always been able to fund needed positions and had to prioritize its hiring for open positions. In addition, because of

the level of expertise CSREES requires of its NPL, quick hires are not always possible. Often times CSREES is unable to meet the salary demands of those it wishes to hire. It is essential that position gaps not only be filled but that they are filled with the most qualified candidate.

Operating under these constraints and given inevitable staff turnover, gaps will always remain. However, the establishment and drawing together of multidisciplinary teams required to complete the Portfolios has allowed the Agency to identify gaps in program knowledge and ensure that these needs are addressed in a timely fashion. To the extent that specific gaps are mentioned by Outside Panel Experts the urgency to fill them is heightened.

- **Issue IV: Integration**

  Lack of integration has been highlighted throughout the panel reviews. While review panelists certainly noted in their reports where they observed instances of integration, almost without fail panel reports sought more documentation in this regard.

Issue IV: Agency Response:

Complex problems require creative and integrated approaches that cut across disciplines and knowledge areas. CSREES has recognized that need and has undertaken steps to remedy this situation. CSREES has recently mandated that up to twenty percent of all NRI funds be put aside specifically for integrated projects. These projects cut across functions as well as disciplines and ensure that future Agency work will be better

integrated. Finally, integration is advanced through the Portfolio process which requires cooperation across units and programmatic areas.

- **Issue V: Extension**

  While most panels seemed satisfied at the level of discussion that focused on research, the same does not hold true for extension. There was a call for more detail and more outcome examples based upon extension activities. There was a consistent request for more detail regarding not just the activities undertaken by extension but documentation of specific results these activities achieved.

Issue V: Agency Response:

Outcomes which come about as a result of Extension are, by the very nature of the work, more difficult to document than the outcomes of a research project. CSREES has recently shuffled its strategy of assigning NPLs to serve as liaisons for states. In the past one NPL might serve as a liaison to several states or a region comprised of states. Each state will be assigned a specific NPL and no NPL will serve as the lead representative for more than one state. This will ensure more attention is paid to Extension activities.

In addition CSREES has also been in discussion with partners and they have pledged to do their best to address this issue. The new POW will make Extension based results and reporting a priority. With heavy emphasis being place on logic models by CSREES, this will have the effect of necessitating the inclusion of Extension activities into the state's POWs. This in turn will require more reporting on Extension activities and allow for the improved documentation of Extension impact.

- **Issue VI: Program Evaluation**

  Panelists were complimentary in that they saw the creation of the office of Planning and Accountability and Portfolio reviews as being the first steps towards more encompassing program evaluation work. However, they emphasized the need to see outcomes and often times stated that the scores they gave were partially the result of their own personal experiences rather than specific program outcomes documented in the Portfolios. In other words, they know first hand CSREES is having an impact but would like to see more systematic and comprehensive documentation of this impact in the reports.

Issue VI: Agency Response:

The effective management of programs is at the heart of the work conducted at CSREES and program evaluation is an essential component of effective management. In 2003 the Portfolio Review Expert Panel and subsequent internal reviews was implemented. Over the past three years eleven portfolios have been reviewed by external panel members and each year this process improves. National Program Leaders are now familiar with the process and the staff of the Planning and Accountability unit has implemented a systematic process for pulling together the material required for these reports.

However, simply managing the process more effectively is not sufficient for raising the level of program evaluations being done on CSREES funded projects to the highest standard. Good program evaluation is a process that requires constant attention by all stakeholders and the agency has focused on building the skill sets of stakeholders in the area of program evaluation. The office of planning and accountability has conducted

trainings in the area of evaluation for both National Program Leaders and for staff working at Land grant universities. These trainings are available electronically and the Office of Planning and Accountability will be working with National Program Leaders to deliver these trainings to those in the field.

The Office of Planning and Accountability is working closer than ever with individual programs to ensure successful evaluations are developed, implemented and the data analyzed. Senior leadership at CSREES has begun to embrace program evaluation and over the coming years CSREES expects to see state leaders and project directors more effectively report on the outcomes of their programs as they begin to implement more rigorous program evaluation. The new Plan of Work system ensures data needed for good program evaluation will be available in the future.

- **Issue VII: Logic Models**

  Panelists were consistently impressed with the logic models and the range of their potential applications. They expressed the desire to see the logic model process used by all projects funded by CSREES and hoped not only would NPL's continue to use them in their work but, also, that those conducting the research and implementing extension activities would begin to incorporate them into their work plans.

Issue VII: Agency Response:

Logic models have become a staple of the work being done at CSREES and the Agency has been very proactive in promoting the use of logic models to its state partners. Two recent initiatives highlight this. First, in 2005, the Plan of Work (POW) reporting system

into which states submit descriptions of their accomplishments was completely revamped. The new reporting system now closely matches the logic models being used in Portfolio reports. Beginning in Fiscal year 2007 states will be required to enter all of the following components of a standard logic model. These components include describing the following:

- Program Situation
- Program Assumption
- Program Long Term Goals
- Program Inputs which include both monetary and staffing
- Program Output which include such things as patents
- Short Term Outcome Goals
- Medium Term Outcome Goals
- Long Term Outcome Goals
- External Factors
- Target Audience

The system is now operational and states are required to begin using it by June of 2006. By requiring the inclusion of the data components listed above states are in essence, creating a logic model which CSREES believes will help better improve both program management and outcome reporting. Please note a sample logic model has been included in Appendix A.

The second recent initiative by CSREES regarding logic models concerns a set of trainings conducted by Planning and Accountability staff. In October and November of

2005 four separate training sessions were held in Monterrey, California, Lincoln, Nebraska, Washington D.C. and Charleston, South Carolina. More than two hundred people representing land grant universities attended these trainings where they were given training in logic model creation, program planning and evaluation. Additionally, two training sessions were provided to NPLs in December 2005 and January 2006 to further familiarize them with the logic model process. Ultimately it is hoped these representatives will pass on to others in the land grant system what they learned about logic models thus creating a network of individuals utilizing the same general approach to strategic planning. These materials have also been made available to the public on the CSREES website.

Part III Portfolio specific Panel Comments and Critiques.

Section II provided a set of common issues raised by Expert Panels reviewing the Portfolios presenting different components of the work that CSREES does. This section addresses specific comments made by the Panel reviewing 1.4. The full panel report is included in Appendix One. In this section each major critique or suggestion offered by the panel for which a solution was not presented in Section II is addressed here.

- **Panel Comment I:**

  The scope of work generally meets expectations; there is adequate coverage of farm structures, but we see a need to achieve greater coverage in the area of sensors. The declining number of Ph.D. degrees awarded may inhibit future research capacity.

Program Staff Response I

In fiscal year 2005, four of the 31 National Research Initiative programs solicited research proposals addressing sensing, detection, or monitoring/measurement methods (food safety, nano-scale science and technology, plant biosecurity, animal disease countermeasures, and air quality). The nanotechnology program focused specifically on sensor development as a priority area. A total of 13 sensor-related projects were funded by the NRI in 2005. The SBIR program continues to support sensor technology development across many of its 12 program areas. Eighteen sensor-related projects were funded by the SBIR program in fiscal year 2005.

- **Panel Comment II**

There are probably more wood construction projects than needed, and the future should include a greater focus on bioenergy, bioproducts, and nanotechnology. The Panel is concerned about an overemphasis on risk management in PA 601 and about CSREES becoming an implementer of other agencies' programs (e.g. Risk Management Agency, and Trade Adjustment Assistance program). CSREES needs to be a more proactive leader in research, extension, and teaching to meet critical needs.

Program Staff Response II

Since 2001, CSREES has actively participated in the coordination, leadership, planning, and management of nanotechnology under the framework of the National Nanotechnology Initiative (NNI), which currently involves 23 Federal departments and agencies. Through the NNI, the agency is taking a concerted effort in charting the course for the research, education and public engagement for nanoscale science, engineering and technology. The importance of the new cutting edge science and technology on improving agriculture and food has gained an increased recognition among the NNI agencies. A number of projects relevant to agriculture and food systems have been funded by several NNI agencies to support activities led by our LGU partners.

The agency has strengthened the investment in nanotechnology research by having established a new competitive program in National Research Initiative (NRI). The program has funded 15 excellent projects of a total of about $4M for FY04 and 05 in a broad spectrum addressing important agricultural and food issues such as novel and high value-added uses of agricultural materials, improving food safety and security against

bio-terrorism, new tools to study biological systems and processes, improving the environment, and effective delivery systems for bioactive compounds in food to facilitate optimal health of consumers. The agency also funded two projects to develop nanotechnology curriculum through the Higher Education Challenge program. Inspired and encouraged by the agency new effort in supporting nanotechnology research and education, many new research projects are now supported by formula funds at experimental stations throughout the country. A multistate research committee (NCDC-201: Nanotechnology and Biosensors) has formed and is in its final stage of preparing the committee proposal. There are also a number of projects supported by SBIR program.

Engineering aspects of materials handling, transport, land use and storage of crop, forest and range products are major issues to be taken into consideration for efficient and cost effective production of bioenergy and bioproducts. Currently, projects that address bioenergy and biobased products fall under PA 511-New and Improved Non-food Products and Processes, and PA-512 Quality Maintenance in Storing and Marketing Non-Food Products. The majority of projects fall under PA 511 and the focus is on conversion technologies.

- **Panel Comment III**

  Identification of contemporary and emerging issues is good. Sensors for food safety and security will be important in the near future and will need greater attention. When the current Concentrated Animal Feeding Operations (CAFO) regulations are

extended to smaller operations, engineering and economic research, and extension will be needed.

Program Staff Response III

In 2005, the NRI's Plant Biosecurity program solicited proposals for evaluating field-based diagnostic and communications tools, real-time monitoring technologies, and associated implementation strategies to promote early detection of high consequence disease/pests prior to their establishment and spread. These emphases represent a shift away from traditional diagnostic facilities (funded previously) toward more technology-based solutions (including sensing mechanisms). Similarly, the 2005 Animal Protection program included within its emphasis area, Animal Disease Countermeasures, a goal to improved diagnostic methods/ pathogen detection systems that provide a foundation to better understanding disease epidemiology and ecology.

In 2005 a new USDA Small Business Innovation Research (SBIR) program was started for Animal Waste Management. This program is intended to encourage small businesses to develop technologies for managing or treating animal manures and wastes from confined feeding operations. CSREES and other USDA agencies are working with EPA to coordinate research needs for animal feeding operations. The six committees were initiated in 2005 and included: air emissions, microbial source tracking, chemical source tracking, manure management processes, land application and technology transfer.

- **Panel Comment IV**

The necessary transition to more integrated work has been accomplished and is going quite well. Principal investigators should be given incentives to take more responsibility for extending research results.

Program Staff Response IV

In October 2005 CSREES organized and held a one day workshop to identify strategies for enhancing the effectiveness of integrated competitive programs. The workshop included presentations and participation by Principal Investigators and National Program Leaders involved with integrated programs. Breakout sessions identified various strategies that included possible incentives for extending research results that will enhance the overall relevance and effectiveness of integrated programs.

- **Panel Comment V**

The application of multidisciplinary approaches within this portfolio falls short of expectations. Work on sensors will need to be multidisciplinary and integrated with other sciences (physics, chemistry and biology) outside of historic working relationships.

Program Staff Response V

Beginning in mid-2004 a new competitive grants program (appearing in the National Research Initiative) was introduced to improve our understanding of the interactions between the economic, social, biological, and environmental components important to small farms and rural economic development. This program attempts to bring together and integrate disparate work conducted separately on each of these factors in the past.

Program outcomes are expected to provide new insights to the factors that enhance rural prosperity, especially for smaller producers.

- **Panel Comment VI**

  The historical alignment of the portfolio with stakeholder needs seems to be good. Harvesting of biomass materials may justify developing new machine concepts. There is a substantial need for mechanization in crops that have high labor requirements. For example, labor cost may force U.S. producers out of the tree fruit business. Such work is now acceptable to labor groups because replacing 2 or 3 workers with machinery is better that having no work for anyone when jobs are exported.

Program Staff Response VI

Staff continues to work with industry groups (tree fruit, citrus, grapes etc.), universities, and other federal agencies to identify important science and application needs and opportunities in the areas of automation and robotics. A ten-agency working group commissioned (2004) and completed (2005) an evaluation of world-wide robotics R&D; the agency has a representative in this group. That representative also authored a while paper entitled, "Increasing Economic Competitiveness and Worker Safety in U.S. Horticultural and Specialty Crops" that provides justification, and a broad outline, for increased R&D in the areas of automation and robotics. This document has been shared with the multi-agency working group and, in another instance, with individual representatives from NSF and NIH. Automation in any industry decreases the number of

low-skill, low-wage jobs, but increases the total number of jobs overall. These new jobs occur in occupations that have higher pay and require better education.

The 2004-2005 Biomass R&D Initiative (joint USDA and Dept. of Energy) has been funding projects dealing with new machines and processes for harvesting, handling, and storage of biomass feedstocks, for example corn stover and small-diameter timber. While the agency does not administer this program, the program's enabling legislation charges CSREES with the responsibility for technology transfer of R&D results. This occurs primarily through agency partnership with Cooperative Extension. Additionally, a multistate research committee (S-1007: Science and Engineering for a Biobased Industry and Economy) will be conducting site reviews of the 2004 projects. The committee will document the relevance and quality of the projects through reports that describe progress, impacts, and technology transfer activities.

- **Panel Comment VII**

  Current and appropriate methodologies are used in research, teaching, and extension.

Program Staff Response VII

There are continuing efforts to encourage faculty in the Land Grant system to use research, teaching, and extension practices that will measure changes. There has been a greater emphasis on measuring the impacts of the efforts such as money saved, health improvements, and water quality improvements. The use of the logic model where

expected impacts are described has helped in the planning of research, teaching, and extension activities.

- **Panel Comment VIII**

  Productivity meets expectations. For example, research funding in engineering divided by the number of published reports results in an average cost of $20,000 per publication; this is comparable to the cost of hiring a graduate student who produces one publication per year.

Program Staff Response VII

A review of the CRIS tables indicates expenditures by CSREES have increased in FY 2003 and FY 2004 for PA's 402 and 404 and remained level for PA 401. This is consistent with the panel observations and recommendations. Data on publications produced was not available at the time of this review. Average cost of publications based on research funding has not been used as an indication of portfolio productivity for other CSREES portfolios.

It also should be noted that the purpose of this section (portfolio productivity) is to demonstrate the ability of CSREES to create and provide services through funding, directing, managing and partnering with its various stakeholders. CSREES uses 4% of the agency's total annual appropriation to administer the various programs of research, extension, education, and integrated activities under its more than 100 authorities. These programs include formula funds, competitive grants, federal administration grants, and special grants. The 4% for administration is significantly lower (less than ½) than other

federal agencies and shows that the agency does provide efficient use of resources to address a broad spectrum of issues in agriculture, food, and natural resources.

The comments of the external review panel were not directed towards the purpose statement but instead towards the productivity of the external partners (Land Grant System)

- **Panel Comment IX**

  Some uncertainty exists because of lack of documentation. CSREES needs to ensure that projects are completed in a timely manner. Hatch projects should be monitored more closely for achieving goals by expected completion dates. Furthermore, some Hatch projects may be allowed to continue for too many years.

Program Staff Response IX

This is an agency-wide issue and therefore should be dealt with on an agency-wide level. However, perhaps because Portfolio 1.4 was the only report that did an analysis of the expected and actual completion dates of the CRIS projects, the comment was one specific to this Portfolio. CSREES will be investigating how best to analyze this information in the future. Some of the issues surrounding completion dates will be address by the implementation of the One Solution and the fact National Program Leaders are now being assigned to one and only one state. These two topics were discussed in greater detail in Section II.

Panel Comment X

The panel noted a concern with an over-emphasis on risk management in PA 601 and about CSREES becoming an implementer of other agencies' programs (e.g. Risk Management Agency and Trade Adjustment Assistance Program).

Program Staff Response X

There are many programs within CSREES that address the farm management needs of America's producers, particularly within research and extension arenas. In research, the Markets and Trade program in the NRI, the Small and Medium Farms Program in the NRI and SBIR. The SARE Program funds many farm management related projects as well. Historically, the largest program in this knowledge area dealing with farm profitability was in an IFAFS program of that same name and was funded at approximately $20-25 million in both 2000 and 2001. But since IFAFS has not been funded since 2001, it was felt that the Risk Management Program which deals with all five areas of risk (production, marketing, human resource, legal & environmental, and financial) addresses the priority issues revolving around the farm management topic area and therefore is an appropriate program to highlight.

CSREES implements programs as directed by Congress, at least with regard to the Risk Management Program. ARPA (Agricultural Risk Protection Act of 2000) established a risk management program to be carried out by CSREES and specifically directed that the Risk Management Agency provide $5 million to CSREES for the implementation of a broad, risk management education program. In comparison, the RMA has an additional $20 million it uses for various risk management education programs. In the Trade Bill of

August 2002, the Congress directed the USDA to develop a Trade Adjustment Assistance Program for Farmers. While the Foreign Agricultural Service became the Executive agent for that program, CSREES was requested to participate by the FAS for the law required that before farmers could receive cash benefits or Department of Labor re-training benefits, they must first receive from an "Extension Service agent or employee" technical assistance on how to adjust to import competition.

It is only logical that CSREES agreed to participate in the TAA Program given this requirement in the law. It should also be noted that other agencies are also involved in this program, namely FAS as the overall manager, ERS as a technical reviewer of petition information and data, FSA as the receiver of applications and the purveyor of cash benefits, and the Department of Labor. In conclusion, the RME Program is a congressionally directed program, and the TAA Program law contains language that provides a fully valid reason why CSREES is involved in the TAA Program.

- **Panel Comment XI**

  The External Evaluation committee noted that there was a need to strengthen overall strategic leadership in economics and engineering programs across the portfolio. The Committee also noted that CSREES should carefully evaluate the practice of regionally outsourcing competitive grant programs such as Risk Management Education, Sustainable Agriculture Research and Education (SARE) and Rural Development centers. There concerns include: "is decentralized regional grants administration more effective than centralized? Is CSREES losing control and accountability? Is there sufficient coordination among the regions?

Program Staff Response XI

It should be noted up front that the preponderance of information regarding the SARE and Regional Rural Development Centers is presented in Portfolio 2.1, which will be evaluated in the January-February timeframe, 2006. Hence the External Evaluation Committee examining Portfolio 1.4 last July 2004 really had minimal information on which to make judgments as to how these two programs were led and operated.

The leadership issue was noted by the committee in their initial discussions looking at Portfolio 1.2 and in other responses in CSREES internal review of Portfolio 1.2., and will not be repeated here. The CSREES position is that the leadership void in economics has been met with the appointment of the new Deputy Administrator for the Economic and Community Systems unit, the transfer of an experienced agricultural marketing NPL into the ECS Unit, and the establishment of an agency-wide social science working group that addresses leadership, management and knowledge voids within the social sciences.

CSREES does not regionally "outsource" competitive grant programs unless so directed by the Congress, or if such "outsourcing" makes good sense from political, resource, management and effectiveness standpoints. For both the SARE and Regional Rural Development Programs, the Congress directed that such programs be regional in nature. As a result these programs have been regional since their establishment by the Congress. Hence the programs are not outsourced, but instead are conducted and managed in partnership between the regions and CSREES. The three NPLs involved in these programs provide national leadership and coordination that includes budget oversight,

setting program guidelines, publicizing and communicating program successes and outcomes, and convening and facilitating cross-regional communication between and within regions.

In terms of the RME Program, it became partially regionalized as a result of those who diligently worked to gain funding for the program in FY 2000. Between 2000 and 2003, there was an annual competition for each regional center, and in addition, CSREES also ran a competitive program nationally. However, in January 2003, four National Program leaders within the ECS unit retired, and one was transferred from Competitive Programs to ECS to fill in for the retired NPLs. As a result both professional and support staff were in short supply, and so it made inimitable sense to fully regionalize the RME Program. Additionally, because of personal shortages, money used for a national competition was divided among the four regions and CSREES got out of the business of conducting RME competitive grants program. Further, what was formerly an annual competition was moved to one competition every four years to provide a "planning horizon" for the four regional centers and the Digital Center for Risk Management Education. Each of the four regional RME Centers, as was the case for the SARE regional centers all became "streamlined" either in 2003 or 2004. This meant that not only were the centers responsible for conducting competitive RME programs in each of their respective regions, they also gained the authority to process the awards and funding through their host universities without having to have CSREES process each of their awards. And finally, in 2004 CSREES published operational guidelines to be followed by each of the four regional centers that specified how they were to conduct their competitive programs,

guidance that previously did not exist. The process and procedures used by SARE to manage their regional competitive programs are well established using two boards to oversee operations, a technical one and an administrative one.

One of the concerns posed by the Committee dealt with the issue as to whether centralized grants administration is more effective than decentralized regional administration. Given the shortfall of personnel within CSREES to manage, process, and fund individual RME projects, having the regions conduct regional (as well as multi-regional, in the case of the RME Program) competitions and then to process the awards is quite effective, equal to if not more effective than if CSREES were conducting the competitions. In addition, by having the regions manage the program in their regions, this permits the SARE and RME NPLs to provide much closer oversight and leadership than would otherwise be the case. The regional Rural Development centers conduct a competition that is overseen by a board of directors consisting of representatives from the State Experiment Stations, the Cooperative Extension Service, Higher Education, stakeholders and others. CSREES believes that the manner in which these programs are conducted and overseen make them highly effective.

A second concern was whether CSREES was losing control and accountability of the program. With regard to the all programs, there are specific reporting requirements that must be met and which are being met, otherwise annual funds would not be released until the requirements are met. Each program operates under an established set of guidelines agreed to by CSREES and our partners. Additionally, each host university is required to

provide oversight and accountability just as CSREES is so required to do of their programs. Finally, CSREES has actually gaining in control and accountability for the manner in which these programs are managed and led has in fact provided the necessary time for the NPLs to more effectively lead and provide necessary oversight of the programs.

A final concern of the committee questioned whether there was adequate coordination among the regions. The answer to this question is that the coordination among the regions has never been better or more effective. Monthly conference calls, semi-annual (more if deemed necessary) coordination and management meetings, and individual conversations have resulted in the regions being fully coordinated in each of the three programs being discussed. The Operational Guidelines under which the regional RME centers operate dictate a much more coordinated program than was the case prior to 2003. All said and done, coordination has been significantly improved over the last two years, particularly the Regional Rural Development Centers programs and the RME Program.

In addition, recently the Southern Rural Development Center and the Southern SARE Program have embarked on a coordinated, joint funding of mutually supportive projects. Likewise, the Southern Regional RME Center is currently in discussions with the Southern SARE Program to perhaps jointly fund some risk management studies to better understand the perceptions of risk and the adoption of new technologies and practices by producers.

- **Panel Comment XII**

Much of the evidence presented to the Panel had to be teased out of a variety of sources by NPLs, rather than being part of a readily accessible database. CSREES' lack of available information meant that the evidence presented was often incomplete.

CSREES needs to be able to report outputs and impacts according to criteria that meet OMB requirements, and also be able to effectively communicate the impact of CSREES programs to all stakeholders via scholarly and stakeholder-oriented communication channels. Teaching and extension activities need to be included in the database. An improved post-award evaluation process needs to be implemented.

Program Staff Response XII

Much of this issue was addressed in section II. However it should be noted here that several logic models were created to fall in line with the CSREES initiative encouraging the development of these instruments. These are presented below.

Scoring the Portfolio

Significant improvements have been made to the programs and initiatives covered under Portfolio 1.4. Some of the improvements have been detailed above and, in December of 2005, the internal panel was convened to numerically assess the work of the Portfolio. Given the significant improvement noted above the panel scored the Portfolio 81. While much work still needs to be done, great progress has been made since the External Panel meeting in 2004. Over the coming years CSREES expects the work being done in Portfolio 1.4 to continue to improve and the score to overall score to rise accordingly.

Appendix I: Expert Panel Report for Portfolios 1.1, 1.2., and 1.4.

CSREES Portfolio Review Expert Panel Report

Portfolio 1.1 Agricultural Markets and Trade
Portfolio 1.2 International Economic Development
Portfolio 1.4 Structure of the Agricultural Sector and Farm Management
CY 1999 -2003

REPORT

External Review Completed: July 2004

Portfolio Overview

Portfolio 1.1 Agricultural Markets and Trade

The Agricultural Markets and Trade (AMT) portfolio focuses on the marketing system that assembles agricultural commodities, converts them into food products, and distributes those products to consumers around the world. CSREES provides program leadership and funding to a combination of research-education-extension programs that enhance the performance of the food marketing system by helping producers, food companies, consumers, and society make better marketing and public policy decisions. The public policy portion of this portfolio also includes a broad range of domestic policy issues in addition to marketing. The portfolio includes three CSREES Knowledge Areas:

- KA 603 Market Economics
- KA 604 Marketing and Distribution Practices
- KA 610 Domestic Policy Analysis

Portfolio 1.2 International Economic Development

In an era of expanding global trade, increased interest in international relationships, and increased concern about terrorism, there are many challenges and opportunities for research, education and extension by CSREES and its partners. The International Economic Development (IED) portfolio focuses on the economies of other nations (both developed and developing) and the interaction between those economies and the U.S. economy. International trade is a major area of interest, as is economic development and development assistance programs. The portfolio includes two CSREES Knowledge Areas:

- KA 606 International Trade and Development Economics
- KA 622 Foreign Policy and Programs

Portfolio 1.4 Structure of the Agricultural Sector and Farm Management

The U.S. agricultural sector must be able to quickly respond to changing political, economic, technological, environmental, and consumer-driven market forces. Agricultural production and marketing are constantly affected by external factors such as weather and growing conditions, diseases and pests, financial conditions, cultural practices, and consumer demand. New and

emerging risks associated with domestic and international policy, genetic technology, exotic invasive species, and complex agricultural diseases that can affect humans defy conventional means of identification, quantification, and management.

CSREES contributes to the improvement and strengthening of this dynamic agricultural system through sponsoring research into alternative methods to identify, assess, and manage risk, providing relevant education, and extending information and practices to improve production and market decision-making through enhanced risk management. Portfolio 1.4 includes Knowledge Areas:

- KA 601 Farm Management and Risk Management
- KA 401, Structures, Facilities, and General Purpose Farm Supplies
- KA 402, Engineering Systems and Equipment
- KA 404, Instrumentation and Control Systems

Comments on R&D Criteria and Dimensions

In 2004 a panel comprised of independent experts from the field was convened to assess and score the current state of the Agricultural Markets and Trade, International Economic Development, and the Structure of the Agricultural Sector and Farm Management Portfolios. A discussion of specific comments and recommendations related to each of the dimensions of the three Office of Management and Budget (OMB) research and development (R&D) criteria used (relevance, quality, and performance) is provided below.

Portfolio 1.1

Relevance

Scope

The wide variety of projects exceeds expectations, but the declining number of undergraduate and graduate degrees awarded in agricultural economics, and the declining number of doctoral degrees awarded in agricultural economics may inhibit future research capacity.

Focus

The portfolio lacks needed focus on critical issues. Too much attention is given to evaluating existing policy relative to the development of new policies and analysis of policy alternatives. Policy analysis should get more attention in the Markets and Trade section of the NRI and in other sections of all competitive grant programs (NRI & Sec. 406).

Emerging Issues

Identification of contemporary and emerging issues is good. More could be done to provide incentives for research on emerging issues, such as creating a special category for such issues in the NRI.

Integration

This portfolio has achieved very good integration of research, teaching, and extension. Principal investigators should be given incentives to take more responsibility for extending research results.

Multidisciplinary Balance

This portfolio has a very good mix of work with other disciplines. Further progress would occur if economic analysis was invited from other competitive program areas outside of Markets and Trade in the NRI.

Quality

Significance

Stakeholder needs are being met. However, more attention should be given to projects that emphasize the "public good" rather than "private good."

Stakeholder Input

Stakeholder input is included at a high level, but there are times when some stakeholders have more influence than they should. CSREES and Land-Grant Universities need to do a better job of communicating stakeholder needs to individual faculty.

Portfolio Alignment

The alignment of portfolio projects with the current state of science-based knowledge and previous work is generally good. Competitive grant projects (e.g. NRI) are more reflective of current science than are core-funded projects. The Panel is concerned that social scientists are much more critical than other scientists when judging competitive grant proposals; hence, a smaller proportion of proposals are deemed fundable. We are concerned that this phenomenon may be used as a signal to decrease funding allocated to this area at a time when socioeconomic issues increasingly drive the U.S. policy agenda reflecting citizens' concerns and needs.

Appropriate Methodology

Current and appropriate methodologies are used in research, teaching, and extension.

Performance

Portfolio Productivity

The portfolio has visibility despite the lack of leadership resources devoted to it.

Portfolio Completeness and Timeliness

Most projects are completed on time. However, Hatch research projects should be monitored more closely to ensure they achieve goals by expected completion dates. Furthermore, some Hatch projects may be allowed to continue for too many years.

Agency Guidance

There is an immediate need for leadership in the area of economics (Economic and Community Systems Deputy Administrator and economics NPLs). It is incomprehensible that the economics programs have been allowed to languish with declining leadership over the past five years. There is also a need to strengthen overall strategic leadership in economics programs across the portfolio. Economists could make significant contributions by addressing critical agricultural and societal issues and should be fully engaged with other NPLs.

Portfolio Accountability

There is a critical need to be able to report outputs and impacts according to criteria established by CSREES for meeting OMB requirements, and a need to effectively communicate the impact of CSREES programs to all stakeholders via scholarly and stakeholder-oriented communication channels. Teaching and extension activities need to be included. An improved, post-award evaluation process needs to be implemented.

Portfolio 1.2

Relevance

Scope

The number and types of projects meets expectations, but the scope in development assistance projects is very limited. The declining number of undergraduate and graduate degrees awarded in agricultural economics and the declining number of doctoral degrees awarded in agricultural economics may inhibit future research capacity.

Focus

The portfolio focus on critical issues generally meets expectations. However, CSREES should be more strategic and proactive in providing leadership to international programs. A single nation (Armenia) should not receive such a disproportionate share (85 percent) of the total developmental assistance funding.

Emerging Issues

Identification of contemporary and emerging issues is good. More could be done to provide incentives for research on emerging issues, such as creating a special category for emerging issues in the NRI.

Integration

This portfolio has achieved very good integration of research, teaching, and extension. Principal investigators should be given incentives to take more responsibility for extending research results.

Multidisciplinary Balance

This portfolio has a very good mix of work with other disciplines. However, the Panel questions whether there is adequate, multidisciplinary participation in development assistance projects. Further progress would occur if economic analyses were invited in other competitive program areas outside of Markets and Trade in the NRI.

Quality

Significance

Stakeholder needs are being met. Appropriate benefits are provided to stakeholders in foreign countries receiving development assistance but the benefits of such programs to U.S. stakeholders seem less clear.

Stakeholder Input

Stakeholder input is at an acceptable level, but there are times when some stakeholders have more influence than they should. CSREES and Land-Grant universities need to do a better job of communicating stakeholder needs to individual faculty.

Portfolio Alignment

The alignment of portfolio projects with the current state of science-based knowledge and previous work
is generally good. Competitive grant projects (e.g., NRI) are more reflective of current science than are core-funded projects. The Panel is concerned that social scientists are much more critical than other scientists when judging competitive grant proposals; hence, a smaller proportion are deemed fundable. We are concerned that this phenomenon may be used as a justification to decrease funding allocated to this area at a time when socioeconomic issues increasingly drive the U.S. policy agenda.

Appropriate Methodology

Current and appropriate methodologies are used in research, teaching, and extension.

Performance

Portfolio productivity

The portfolio has visibility despite the lack of leadership resources devoted to it.

Portfolio Completeness and Timeliness

Most projects are completed and on time. However, Hatch projects should be monitored more closely to ensure they achieve goals by expected completion dates. Furthermore, some Hatch projects may be allowed to continue for too many years.

Agency Guidance

CSREES is doing a good job of managing "pass-through" funds for development assistance projects, but strategic leadership for the entire program is clearly needed. There is an immediate need for leadership in the area of economics (ECS Deputy Administrator and economics NPLs). It is incomprehensible that the economics programs have been allowed to languish with declining leadership over the past five years. There is also a need to strengthen overall strategic leadership in economics programs across the portfolio. Economists could make significant contributions by addressing critical agricultural and societal issues and should be fully engaged with other NPLs.

Portfolio Accountability
There is a critical need to be able to report outputs and impacts according to criteria established by CSREES for meeting OMB requirements, and a need to effectively communicate the impact of CSREES programs to all stakeholders via scholarly and stakeholder-oriented communication channels. Teaching and extension activities need to be included. An improved, post-award evaluation, process needs to be implemented.

Portfolio 1.4

Relevance

Scope

The scope of work generally meets expectations and there is adequate coverage of farm structures, but there is a need to achieve greater coverage in the area of sensors. The declining number of doctoral degrees awarded may inhibit future research capacity.

Focus

There are probably more wood construction projects than needed, and the future should include a greater focus on bioenergy, bioproducts, and nanotechnology. The Panel is concerned about an overemphasis on risk management in KA 601 and about CSREES becoming an implementer of other agencies' programs (e.g. Risk Management Agency, and Trade Adjustment Assistance program). CSREES needs to be a more proactive leader in research, extension, and teaching to meet critical needs.

Emerging Issues

Identification of contemporary and emerging issues is good. Sensors for food safety and security will be important in the near future and will need greater attention. When the current Concentrated Animal Feeding Operations (CAFO) regulations are extended to smaller operations, engineering and economic research, and extension will be needed.

Integration

The necessary transition to more integrated work has been accomplished and is going quite well. Principal investigators should be given incentives to take more responsibility for extending research results.

Multidisciplinary Balance

The application of multidisciplinary approaches within this portfolio falls short of expectations. Work on sensors will need to be multidisciplinary and integrated with other sciences (physics, chemistry and biology) that occupy space outside of historic working relationships.

Quality

Significance

Stakeholders are well served by this portfolio. The Midwest Plan Service has been a great source of output and the number and quality of educated young engineers are the greatest output of the System.

Stakeholder Inputs

Stakeholder input is incorporated at a high level. The System responds well to the engineering needs of producers and agribusinesses. CAFO regulations are a great example – the System had a major role in providing information and shaping the regulations. Industry has a good working relationship with the agricultural research and education system when it comes to setting priorities.

Portfolio Alignment

The historical alignment of the portfolio with stakeholder needs seems to be good. Harvesting of biomass materials may justify developing new machine concepts and there is a substantial need for mechanization in crops that have high labor requirements. For example, labor costs may force U.S. producers out of the tree fruit business. Such mechanization is now acceptable to labor groups because replacing two or three workers with machinery is better that having no work for anyone when jobs are exported.

Appropriate Methodology

Current and appropriate methodologies are used in research, teaching, and extension.

Performance

Portfolio Productivity

Productivity meets expectations. For example, research funding in engineering divided by the number of published reports results in an average cost of $20,000 per publication. This cost is comparable to the expense of hiring a graduate student who produces one publication per year.

Portfolio Completeness and Timeliness

Some uncertainty exists because of lack of documentation. CSREES needs to ensure that projects are completed in a timely manner. Hatch projects should be monitored more closely to ensure they achieve goals by expected completion dates. Furthermore, some Hatch projects may be allowed to continue for too many years.

Agency Guidance

CSREES appears to administer its programs fairly and objectively. NPL leadership is good in specified engineering areas (i.e. nanotechnology), but there is a need to strengthen overall strategic leadership in economics and engineering programs across the portfolio. CSREES should carefully evaluate the practice of regionally outsourcing competitive grant programs such as risk management education, Sustainable Agriculture Research and Education (SARE), and Rural Development Centers. While leveraging resources is generally a wise strategy, our concerns include:

- Is decentralized regional grants administration more effective than centralized?
- Is CSREES losing control and accountability?
- Is there sufficient coordination among regions?

Portfolio Accountability

Much of the evidence presented to the Panel had to be teased out of a variety of sources by NPLs, rather than being part of a readily accessible database. CSREES' lack of available information meant that the evidence presented was often incomplete.

CSREES needs to be able to report outputs and impacts according to criteria that meet OMB requirements and, also, be able to effectively communicate the impact of CSREES programs to all stakeholders via scholarly and stakeholder-oriented communication channels. Teaching and extension activities need to be included in the database. An improved post-award evaluation process needs to be implemented.

Comments on Future Directions presented by CSREES

The National Research Initiative (NRI) should set aside a portion of its funds (perhaps 10 percent) to address critical emerging issues, while allowing NRI to continue funding its ongoing lines of research. Proposals submitted for critical emerging issues could be interdisciplinary and multifunctional (research-teaching-extension).

The term "core funding" should be used instead of "formula funding." The latter is perceived as an entitlement program similar to USDA's entitlement programs for farmers and low income consumers.

Other federal science agencies have core funding but do not receive criticism like agriculture does. Core funding is an important part of the total CSREES/Land-Grant portfolio of funds that gives the system the stability and agility needed to address a wide variety of existing and

emerging issues. Research, teaching, and extension activities are important dimensions of the portfolio and enable the System to create new knowledge, increase understanding, and improve decision making.

CSREES needs to improve its post-award management process. While the Panel does not perceive non-performance and under-performance to be a major problem, there is evidence that some projects are not completed in a timely manner. Further, the perception that some recipients are not held strictly accountable for grants and core funding damages the credibility of the USDA/Land-Grant System.

To achieve greater recognition for its contributions to research, teaching and extension, CSREES needs to require that a specific citation be used on all materials published as a result of its funding (both hard copy and electronic copy). This will help to ensure that CSREES receives the deserved credit for its participation in projects that made the publications possible.

Data Issues

The Current Research Information System (CRIS) database needs to be improved so that it captures more useful information about the research being conducted. CRIS also needs to be expanded to capture teaching and extension activities. Furthermore, there is a need to capture the synergy of research, teaching, and extension working together to address important societal concerns.

Individual Panel members had some suggestions for improving the system such as:

- Identifying common performance indicators and criteria for measuring outcomes/impacts.
- Using more explicit templates for inputting information.
- Convincing faculty of the importance of the system.
- Withholding a portion of grant funds until CSREES is satisfied that deliverables have been completed and reports filed.
- Capturing impacts after the work is completed.

However, the total plan for improving the system needs to be fleshed out by a USDA/university task force.

Evaluation Issues

CSREES needs to improve its system for capturing and reporting the outputs and impacts of its research, teaching and extension activities. It also needs to align reporting requirements with the portfolio management process and the evaluation criteria established by OMB. The ability of the Panel to make informed judgments about the relevance, quality, and performance of each portfolio was limited by the information available for the review. An improved system is needed to report the benefits of CSREES/Land-Grant programs not only to OMB, but also to the System's many other stakeholders.

Summary of Comments and Recommendations

The Portfolio Review Panel commends CSREES staff for their management of these diverse portfolios. However, we urge CSREES to give high priority to correcting the leadership deficit in the economics area and to providing needed strategic thinking and planning for all three portfolios.

The Panel also commends CSREES for establishing this portfolio review process as a way to meet OMB's requirements for assessing the relevance, quality and performance of the Agency's programs. We encourage CSREES to improve its data collection process for capturing the full

scope and impact of CSREES/Land-Grant research, teaching and extension programs not only to satisfy OMB, but also to meet the needs of all stakeholders.

Portfolio 1.4 was difficult to assess because of its mixture of unrelated engineering and economics programs. We recommend the creation of two separate portfolios in the future: one focused on engineering and perhaps called "Farm Structures and Technologies for Agriculture;" the second focused on "Farm Management," making it more parallel to the topics and titles of Portfolio 1.1 and 1.2.

The Panel urges the Administrator of CSREES to address the deficit of leadership in the area of economics. The number of NPLs trained in economics has declined precipitously (from 5 to 2) over the past five years, and the Economics and Community Systems unit has been without effective Deputy Administrator leadership for over 2 years. With this many vacancies in key leadership positions the CSREES/Land-Grant partnership is not functioning as well as it should.

The leadership deficit affects the relevance, quality and performance of Portfolios 1.1, 1.2 and the economics portion of 1.4. The most notable result is the lack of strategic thinking and planning for a comprehensive program. The Panel is concerned about the approach of chasing or receiving funds, and accompanying administrative requirements, from other agencies, such as those that support risk management education, trade assistance adjustment, and development assistance activities, when they do not appear to be part of a plan to achieve the Agency's strategic objectives. These "pass-through" funds demand and receive the scarce CSREES leadership resources that might be better used in other ways.

The leadership deficit in economics also affects the relevance, quality, and performance of CSREES in a more general way because economists are not present to offer their systems thinking and interdisciplinary approaches to the wide range of societal issues being addressed by the Agency. Economists also bring an understanding of policy alternatives and policy analysis which is vital to many of the issues being addressed by all program units and all CSREES strategic goals.

The Panel is concerned that all policy work (policy analysis, public policy education, etc.) is reported only in the Knowledge Areas (KAs) in Portfolio 1.1 (KA 610) and Portfolio 1.2 (KA 611) (Strategic Goal 1). Local, state, national, and international laws and regulations have a significant impact on the portfolios that support increasing economic opportunities and improving quality of life in rural America (Strategic Goal 2), enhancing protection and safety of the Nation's food supply (Strategic Goal 3), improving the Nation's nutrition and health (Strategic Goal 4), protecting and enhancing the Nation's natural resource base and environment (Strategic Goal 5). By gathering all policy work into two portfolios in Strategic Goal 1, too little attention is given to the impact of policy alternatives in all of the CSREES program areas. The Panel recommends the creation of additional KAs to capture these critical applications of policy work.

The Panel commends the CSREES engineering group for its leadership in organizing and conducting the strategic planning workshop on nanotechnology designed to develop a roadmap for new research, teaching, and extension actions. Similar workshops are needed in other areas, especially in Portfolios 1.1 and 1.2.

CSREES needs to work closely with the Land-Grant universities to assure the highest quality research and education, communicate its strength within the scientific community, and revitalize the Land-Grant mission of high quality service to the Nation.

Despite the fact that over 250 studies by government, Land-Grant and non-Land-Grant institutions have estimated consistently high levels of return on public investment in agricultural research and extension (http://www.ifpri.org/pubs/abstract/113/ab113.pdf), and that no such comprehensive studies have been done on other scientific fields, agricultural science is not well respected in some segments of the scientific community.

Collaboration with other funding agencies is critical at this juncture for a variety of reasons. These reasons include:

- Quality assurance.
- Maximizing returns to public investment in research and education.
- Solving complex social problems.

Recent steps taken by CSREES to establish collaborative programs with National Science Foundation, National Institutes of Health, National Aeronautics and Space Agency, and other science agencies are commendable and need to be expanded to include other areas, such as those involving economics and engineering. Work on collaborative efforts should be included in the position descriptions for NPLs, including new NPLs in economics. The collaborative programs should include CSREES as a full partner in developing and executing the programs, not just as a conduit for pass-through funding.

Portfolio Score

Portfolio 1.1 received a total score of 75 from the panel. This score places the portfolio in the category 'moderately effective in supporting CSREES objectives.'

Portfolio 1.2 received a total score of 69 from the panel. This score places the portfolio in the category 'adequately supports CSREES objectives.'

Portfolio 1.4 received a total score of 73 from the panel. This score places the portfolio in the category 'moderately effective in supporting CSREES objectives.'